AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) A decoding method of decoding Low Density Parity Check ("LDPC") codes, the LDPC codes being represented by an original check matrix, said decoding method comprising:

an obtaining step of permuting at least two columns or two rows of the original check matrix to obtain ~~obtaining~~ a transformation check matrix ~~by performing at least one of a row permutation and a column permutation on an original check matrix~~; and

a decoding step of decoding said LDPC codes by using the obtained transformation check matrix.

2. (Previously Presented) The decoding method according to claim 1, wherein

by using, as a formation matrix, a P x P unit matrix, a quasi-unit matrix in which one or more 1s, which are elements of the unit matrix, are substituted with 0, a shift matrix in which said unit matrix or said quasi-unit matrix is cyclically shifted, a sum matrix, which is the sum of two or more of said unit matrix, said quasi-unit matrix, and said shift matrix, and a P x P 0-matrix, said transformation check matrix is represented by a combination of a plurality of said formation matrices.

3. (Previously Presented) The decoding method according to claim 1, further comprising:

a code sequence permutation step of performing, on the code sequence of said received LDPC codes, the same column permutation as the column permutation performed on said original check matrix and outputting a permuted code sequence, wherein

in said decoding step, said code sequence is decoded by using said transformation check matrix and said permuted code sequence.

4. (Currently Amended) A decoding apparatus for decoding Low Density Parity Check ("LDPC") codes, the LDPC codes being represented by an original check matrix, said decoding apparatus comprising:

obtaining means for permuting at least two columns or two rows of the original check matrix to obtain ~~obtaining~~ a transformation check matrix ~~by performing at least one of a row permutation and a column permutation on an original check matrix~~; and

decoding means for decoding said LDPC codes by using the obtained transformation check matrix.

5. (Previously Presented) The decoding apparatus according to claim 4, wherein

by using, as a formation matrix, a P x P unit matrix, a quasi-unit matrix in which one or more 1s, which are elements of the unit matrix, are substituted with 0, a shift matrix in which said unit matrix or said quasi-unit matrix is cyclically shifted, a sum matrix, which is the sum of two or more of said unit matrix, said quasi-unit matrix, and said shift matrix, and a P x P 0-matrix, said transformation check matrix is represented by a combination of a plurality of said formation matrices.

6. (Original) The decoding apparatus according to claim 5, wherein said decoding means comprises:

check node calculation means for simultaneously performing p check node computations for decoding said LDPC codes; and

variable node calculation means for simultaneously performing p variable node computations for decoding said LDPC codes.

7. (Previously Presented) The decoding apparatus according to claim 6, wherein

said check node calculation means comprises p check node calculators for performing computations of check nodes; and

said variable node calculation means comprises p variable node calculators for performing computations of variable nodes.

8. (Original) The decoding apparatus according to claim 6, wherein

said decoding means further comprises message storage means for simultaneously reading and writing message data corresponding to p edges obtained as a result of said computations of the p check nodes or the p variable nodes.

9. (Original) The decoding apparatus according to claim 8, wherein

said message storage means stores message data corresponding to the edges which are read during a check node computation in such a manner that is of said transformation check matrices are padded closer in the row direction.

10. (Original) The decoding apparatus according to claim 8, wherein

said message storage means stores message data corresponding to the edges which are read during a variable node computation in such a manner that is of said transformation check matrix is padded closer in the column direction.

11. (Original) The decoding apparatus according to claim 8, wherein

said message storage means stores, at the same address, messages corresponding to p edges belonging to a unit matrix, a quasi-unit matrix, or a shift matrix whose weight is 1 when the formation matrices, whose weight is 2 or more, representing said transformation check matrix are represented in the form of the sum of the unit matrix, the quasi-unit matrix, or the shift matrix, whose weight is 1.

12. (Previously Presented) The decoding apparatus according to claim 8, wherein

said message storage means comprises number-of-the-rows/p FIFOs and number-of-the-columns/p FIFOs; and

said number-of-the-rows/p FIFOs and said number-of-the-columns/p FIFOs each have a number of words corresponding to the weight of the rows and columns of said check matrix, respectively.

13. (Previously Presented) The decoding apparatus according to claim 8, wherein

said message storage means comprises a Random Access Memory ("RAM"), and said RAM stores said message data in such a manner as to be padded closer in the read-out sequence and reads said message data in the storage position sequence.

14. (Original) The decoding apparatus according to claim 6, wherein

said decoding means further comprises received information storage means for storing received information and simultaneously reading p pieces of the received information.

15. (Original) The decoding apparatus according to claim 14, wherein

said received information storage means stores said received information in such a manner that said received information can be read in the sequence necessary for said computations of variable nodes.

16. (Original) The decoding apparatus according to claim 6, wherein

said decoding means further comprises cyclic shift means for cyclically shifting messages obtained as a result of said p check node computations or said p variable node computations.

17. (Original) The decoding apparatus according to claim 16, wherein

said cyclic shift means comprises a barrel shifter.

18. (Previously Presented) The decoding apparatus according to claim 4, further comprising:

code sequence permutation means for performing, on the code sequence of said received LDPC codes, the same column permutation as the column permutation performed on said original check matrix and outputting a permuted code sequence, wherein

said decoding means decodes said code sequence by using said transformation check matrix and said permuted code sequence.

19. (Previously Presented) The decoding apparatus according to claim 18, further comprising:

inverse permutation means for performing, on the output of said decoding means, an inverse permutation of a column permutation performed on said original check matrix, and for outputting a final decoded result.

20. (Currently Amended) A computer readable medium having a program for causing a computer to perform a decoding method for use with a decoding apparatus for decoding Low Density Parity Check ("LDPC") codes, the LDPC codes being represented by an original check matrix, said method comprising:

an obtaining step of permuting at least two columns or two rows of the original check matrix to obtain ~~obtaining~~ a transformation check matrix ~~by performing at least one of a row permutation and a column permutation on an original check matrix~~; and

a decoding step of decoding said LDPC codes by using the obtained transformation check matrix.